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HIGH-SPEED METHODS, NEW CUTTERS, GRINDING WHEELS

INCREASING PRODUCTIVITY OF MACHINE-TOOL PARK -- Kiev, Pravda Ukrainy, 9 Apr 52

One of the simplest ways to increase machine-tool speeds is by increasing the number of spindle revolutions. The number of revolutions of a large number of machine tools (with the exception of new-design high-speed machine tools) can be increased 30-50 and in exceptional cases, 80-100 percent.

With an increased number of revolutions, methods must be found to increase the power transmitted. Computations show, for example, that gear transmissions of a main drive can transmit greater power at high speeds than the power of the motor.

Thus, the weak link of the drive is not the gears, as is usually thought, but either the motor, belt drive, or friction clutches. The replacement of a motor with a more powerful one is not difficult. However, it must be borne in mind that with a short machining time which is characteristic for high-speed cutting, overloading the motor 25-30 percent is quite safe. This is a very effective way of increasing the productivity of low-power machine tools at high cutting speeds.

Increasing the power transmitted by the belt or friction clutch is not difficult either. This can be achieved by increasing the number of driving shaft revolutions which, with a belt drive, simply means increasing the diameter of the pulley on the motor. For further increase of power, flat belts can be replaced by V-belts, and their number increased. Somewhat more difficult, as a rule, is reinforcing the friction clutches, because the services of a designer are required in this case.

Nonetheless, even large-scale remodeling is possible at any enterprise.

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The next step in extending increased operating conditions of equipment is to broaden the field for the application of high-speed methods in every way possible to envelope all new types of processing.

The application of high-speed operating conditions is not the only method for increasing productivity of equipment. On some machine tools, high-speed machining with hard alloys is as yet impossible or of little effect. For this reason, it is important in these cases to utilize other methods for increasing the productivity of the cutting process. This can be done by increasing the cross section of the chip; or in other words, increasing the depth of cut and the feed. For example, high-speed cutting as yet cannot be used on planing machines. The practical speed cannot exceed 24 meters per minute. However, in rough planing, if cutting tools with a large radius of rounding at the apex are used, the feed can be increased 4-6 millimeters. In addition, a satisfactory surface finish is maintained and the durability of the tool is increased.

In finish planing, wide finishing tools are used, permitting a greatly increased feed. This gives a huge increase in productivity. Thus, at the Kramatorsk Heavy Machine-Tool Building Plant, wide cutting tools operating with feeds up to 100 millimeters for one double stroke of the table are used. -- S. Rudnik, professor, Kiev Polytechnical Institute

HIGH-SPEED METHODS -- Tashkent, Pravda Vostoka, 6 Mar 52

Lathe operators at the Tashsel'mash (Tashkent Agricultural Machine Building) Plant are introducing high-speed methods of metal cutting.

In machining a shaft of a lead apparatus on a new DIP-200 lathe, one worker brought the cutting speed to 160 meters per minute, when the depth of cut was from 3 to 6 millimeters, and the feed was 1.21 millimeters. Under these cutting conditions, a cutter with a T-15-K-6 hard alloy blade, fastened mechanically, lasted through 4 hours of machining.

Interest is being shown in new cutters and attachments. A follow (brodyachiy) rest with ball bearings instead of cast iron bushings is being used. This rest, designed by Yevelenko, engineer, permits boring of shafts 22 millimeters in diameter and 670 millimeters long at high speeds, with a 2-millimeter depth of cut and 0.5-0.8 millimeter feed.

NEW 12-CUTTER MILLING HEAD -- Moscow, Moskovskaya Pravda, 20 Apr 52

Five years ago, Nikolay Vdovin, a pioneer in high-speed milling at the Kolomna Locomotive Building Plant imeni V. V. Kuybyshev, used a four-cutter milling head 150 millimeters in diameter for the first time.

Recently, he assigned himself the task of developing a more durable milling cutter to increase the speed and depth of milling without increasing the power of the machine tool. He figured that if the number of cutters, that is teeth, are increased, the space between them would be smaller and the load on each cutter would be less; consequently, the durability of the mill would increase and operation at higher speeds would be possible.

With this in mind, Vdovin replaced the four-cutter head with one of 12 cutters. Such a head was made and tested recently. N. Vdovin brought the spindle speeds of a vertical milling machine to 800 revolutions per minute and the feed to 790 millimeters, with the depth of cut at 3 millimeters. The surface finish improved noticeably, and the operation of the machine tool became smoother.

Comparative testing of the old and new mills in machining steel of the same type showed that the new 12-cutter mill was almost three times as productive as the old.

SPEEDS AND FEEDS IN HIGH-SPEED CUTTING -- Moscow, Moskovskaya Pravda, 24 Feb 52

Boris Kulagin, a lathe operator at the Moscow Grinding Machine Plant, notes that in roughing operations, he usually uses a cutting speed of from 100 to 180 meters per minute, with a feed of 0.8-1.2 millimeters per spindle revolution and depth of cut of up to 15 millimeters. Under such operating conditions, his cutters work without interruption for 35-45 minutes.

Finish machining is done at a speed of up to 350 meters per minute, feed up to 0.5 millimeters, and depth of cut from 1 to 3 millimeters. For extra fine machining of holes, he uses speeds up to 120 meters per minute and a feed of 0.1 millimeters. The life of cutters in finish machining is up to 25 minutes.

ROUGH AND FINISH PARTS IN ONE PASS -- Kiev, Pravda Ukrainy, 8 Feb 52

Machine builders at the Novo-Kramatorsk Plant imeni Stalin are searching for ways of utilizing the full capacity of machine tools. A new tool holder (opravka) permitting simultaneous machining of large machine parts with five cutters on planing machines has been developed at the plant's cutting laboratory. The cutters, which are set in step-like order, rough and finish a part in one pass. A chip up to 85 millimeters in cross section is cut. Earlier, it was removed with one cutter after several passes. Tooling time has been cut to one third.

More than 150 machine-tool operations at the plant's machine shops have been converted to multicutter machining of parts.

ORIGIN OF "MIKROLIT" CUTTERS -- Moscow, Pionerskaya Pravda, 15 Feb 52

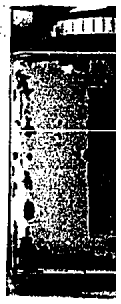
New cutters, not of metal but of stone, are made by chemical means. They are considerably harder than cutters made of the hardest alloys, yet they cost a great deal less.

The superhard stone which is called mikrolit was developed in the laboratory of glass technology of the Moscow Chemical Engineering Institute imeni Mendeleyev. In the beginning, Prof I. I. Kitaygorodskiy and his assistants, N. M. Pavlushkin and Ts. N. Gurevich, did not have cutters in mind. They were attempting to develop a material for special insulators which could withstand a very high temperature. Selecting and combining different minerals, one day, they got a mixture which with suitable processing turned into a stone almost as hard as diamond.

The new stone showed unusual durability. A plate of it withstood a pressure of 4,000 kilograms per square centimeter and did not disintegrate at a temperature of approximately 2,000 degrees!

Workers of the metalworking industry became interested in the new stone. Better and better machine tools which can machine at unheard-of speeds are being produced. However, the hard-alloy cutters cannot withstand the temperature which is generated at such super-speed cutting.

The stone cutters are now being tested at many plants in the country.



FLEXIBLE GRINDING WHEELS OF RUBBER AND ABRASIVES -- Yerevan, Kommunist, 6 Feb 52

Scientists of the Leningrad All-Union Scientific Research Institute of Abrasives and Grinding have developed a technology for precision processing of bearing parts with abrasives. This technology will be used at automatic plants.

Dozens of new abrasive tools for automatic equipment have been manufactured at the experimental plant of the institute. All tools have been computed to grind at a speed of 50 meters per second.

Finishing of ball-bearing races to the necessary accuracy at automatic plants will be done mechanically with the use of special flexible grinding wheels made of rubber and minute abrasive grains. Several types of grinding wheels for most precise operations have been made of hard vulcanized rubber. Such wheels assure a high quality of finish on steel with the use of high-speed methods.

10TH ANNIVERSARY OF ABRASIVES PLANT -- Tashkent, Pravda Vostoka, 13 Jan 52

The personnel of the Tashkent Abrasive Tool Plant recently celebrated the tenth anniversary of its enterprise.

In the past 10 years, the plant has been converted into a large-scale industrial enterprise, equipped with the latest machines. High-duty presses, heat-treatment furnaces, and other equipment for the manufacture of abrasive wheels have been installed in the shops.

Grinding wheels with the Tashkent Plant mark can be found in the Urals, Siberia, Far East, and in the central and other regions of the Soviet Union.

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